

# THE DOUGLAS FIR TUSSOCK MOTH:

# AN IMPACT STATEMENT RELATING TO PRIVATE LANDS IN NORTHEASTERN OREGON

J.E.Schroeder  
Oregon State Forestry Dept.  
Salem, Oregon  
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ON PRIVATE FOREST LAND IN NORTHEAST OREGON

Prepared by  
Oregon State Forestry Department  
Salem, Oregon

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## IMPACT OF THE DOUGLAS-FIR TUSSOCK MOTH ON PRIVATE FOREST LAND IN NORTHEAST OREGON

### PURPOSE

This statement describes the impact of the Douglas-fir tussock moth infestation in northeastern Oregon as it has affected the state and privately owned lands for which the Department of Forestry has statutory responsibility.

### THE PROBLEM

In northeast Oregon 438,450 acres of forest land have been defoliated to varying degrees by the tussock moth infestation during 1972-73. Though the majority of the lands affected are in United States Forest Service holdings, a substantial portion, 109,000 acres or 25 percent of the outbreak, is on private and state-owned lands. Of these 109,000 acres, over 98 percent is privately owned. The nature of the infestation poses a serious threat by defoliation to additional large tracts of public and private forest lands.

It was estimated that in 1972 approximately 118,650 acres were infested by the tussock moth in the Wallowa-Whitman National Forest, the Umatilla National Forest and on private lands in northeastern Oregon. Early in 1973, the Oregon State Forestry Department and the United States Forest Service projected defoliation of varying degrees in 1973 to 305,830 acres in Oregon. The projection has proved to be short of reality. Current surveys indicate that the tussock moth has spread to 438,450 acres of Oregon timberlands. Trees on approximately 51,000 acres are dead.

The State of Oregon sought the use of a strictly controlled and limited application of DDT in the spring of 1973 in an effort to avert the increased infestation. This request was from the Governor with the support of the Department of Environmental Quality and natural resource agencies. Comments received by the U. S. Forest Service were 98 percent favorable for the use of DDT. That request was denied, and the aftermath has been labeled "disastrous". It is believed that the actual loss from insect damage is far more devastating to the environment than would have been the application of DDT under the guidelines proposed.

#### THE SITUATION

The facts of the situation are briefly summarized as follows:

1. There are 579 private forest ownerships within the zone of infestation. The Oregon State Department of Transportation (State Parks Branch), the Oregon State Board of Forestry, the Oregon State Wildlife Commission and Umatilla County also have forest land within the zone.
2. The tussock moth infestation has caused measurable damage to 109,000 acres of state and private forest land.

<u>Damage Type</u>	<u>Acreage</u>
1. Tree Killing, Heavy Mortality	12,649
2. Top Killing, Scattered Mortality	21,976
3. Light Defoliation	47,319
4. Dead (Killed in 1972)	845
5. Clearcut Salvage Areas	2,739
	<u>85,528</u>
6. Minor Damage	23,482
	<u>109,000</u>
Subtotal	
Total	

3. There are 2,609 owners with ownerships of 1,000 acres or less in Umatilla, Union, Wallowa and Baker Counties. It is estimated that 32,980 acres or ten percent of these lands are infested. Boise Cascade Corporation, the largest private landowner in the area, owns 198,616 acres. Over 71,000 acres or 36 percent of these holdings are infested.

Number of Private Landowners Impacted  
(Wallowa, Union, Umatilla and Baker Counties)

<u>Ownership Size Class (Acres)</u>	<u>Total Owners</u>	<u>Total Tbr. Acres</u>	<u>Owners Affected</u>	<u>Acres Infested</u>	<u>Percent</u>	
					<u>Owners Affected</u>	<u>Acres Infested</u>
< 1,000	2,609	325,082	561	32,982	21%	10%
> 1,001	94	476,945	18	73,334	19%	15%
Total Private Land	2,703	802,027	579	106,316	21%	13%
State and County				684		
Private Land in Malheur County				2,000		
				<u>109,000</u>		

4. The private and state land within the zone of infestation is used primarily for permanent and recreational homesites, timber production, recreation, and winter range for big game. The watershed for the City of Walla Walla, Washington, which straddles the Oregon-Washington border, is also involved. All of these land uses are adversely affected by the infestation.

Nearly half of the private forest land ownerships within the zone of infestation represent permanent or recreational homesites for people employed in one of the nearby communities. This land is normally valued from a low of

\$500 to a high of \$1,500 per acre. Defoliation or death of the trees reduces property values from 25 to 50 percent.

There are 802,027 acres of private forest land in the four-county area. Approximately 679,000 acres of this are devoted to timber production of which 16 percent (109,000 acres) is infested. The infested lands are the most productive in northeast Oregon with an average growth of 150 to 200 board feet annually. The average growth per acre for all private commercial forest land in northeast Oregon is close to 125 board feet annually.

5. The annual milling capacity of the area within or adjacent to the zone of infestation is 572 million board feet. Approximately 11 percent (63 million) originates on private lands in Oregon.
6. During the 1971-72 season, the State Parks within the zone of infestation recorded approximately 350,000 day visitors and 30,000 night campers.
7. Private land in the infestation zone contains much of the winter range for elk and deer. This is in contrast to the higher elevation lands of the United States Forest Service which provide summer range.
8. Almost all of the private forest land in northeast Oregon has been cropped periodically in the past. Normally the

merchantable trees are selectively cut from the stands every 15 to 20 years. Consequently, much of the land now supports vigorous young trees whose principal value lies in the wood fiber that can be produced in the future years. Of the commercial forest land in the present insect outbreak, approximately 38 percent supports immature stands of trees. In addition, at least two-thirds of the stands infested are under some form of intensive management.

9. The Northeast Oregon District of the Oregon State Forestry Department, which provides fire protection to the infested area, suppresses an average of 116 wildfires per year. These fires annually burn 1,787 acres and cost \$69,847 in direct suppression costs. The forest fire season averages approximately 100 days, with 90 percent of the wildfires on state-protected lands occurring between June 10 and September 15. Sixty-three percent (63%) of the fire occurrence is caused by lightning, and the remaining 37 percent is man-caused fires.

The history of fire occurrence on private land within the zone of infestation is substantially higher than that of the average situation in northeast Oregon.

## DISCUSSION

The nature of the tussock moth infestation in northeast Oregon forests has biological and social implications that have special significance to the Oregon community and the private landowners involved.

### Impact On The Forest

1. Table I shows the infested acres by defoliation class.

On the Class I areas the majority of the trees will be completely defoliated and die. On the Class II areas the majority of the trees will have at least a quarter of the crown completely defoliated. On Class III areas the trees will lose at least the current year's foliage. While most trees in the Class I areas die, only limited mortality occurs in the Class II and III areas. In these latter areas trees suffer top kill and lose an average of four years' growth. Presently, there is no way of predicting which acres will become Class I, II, or III areas.

2. The present infestation will have a subtle impact on the local timber industry. On private forest lands, an estimated 236 million board feet of timber will be lost through mortality in 1973 (Table II). Of this, 187 million or 75 percent will be salvageable. The value of the projected loss in terms of mortality and growth is slightly over 6.3 million dollars (Table III).

3. The relationship between the private and federal lands is unique in many respects. The federal lands are largely inaccessible during the winter months because of their elevation. As a result, the lower private lands are worked mainly during the winter months. The amount of timber that will need salvaging because of the outbreak could change this relationship considerably during the next two years. For example, Boise Cascade Corporation mills account for 75 percent of the milling capacity located in Oregon and adjacent to the area. Presently, it is in the process of salvaging about 100 million board feet from its own lands and has an equivalent amount that may need salvaging next year. If the infestation proceeds as projected, 50 to 60 percent of Boise Cascade's milling capacity will come from its own lands during the next two years. The net results will be that private lands will be providing closer to 40 or 50 percent of the raw material and will be competing with Forest Service lands for salvage attention. The private companies will probably give priority to their own lands, thereby lessening the need for federal timber and creating a temporary surplus that has to be utilized immediately if it is to be saved from deterioration. Following the salvage period, however, there will be a decrease of seven to ten million board feet annually available from private lands for

approximately twenty years. This shortage, even though small, could influence the viability of the smaller mills in the area as these mills depend primarily on private lands for their needed raw materials. There are seven such mills in the area with annual milling capacities ranging from 50 thousand board feet to 15 million board feet. Collectively they process slightly over 33 million board feet each year. Presently, it takes eight to ten men to process every million board feet of the timber. If the volume loss was not made up from federal lands, this means somewhere between 50 and 100 jobs would be in jeopardy.

4. The prospect of uncontrolled infestations in the forest has added a new factor to the normal economic risk of private forest land ownership. The practical aspect of the matter is that bankers cannot afford to loan funds to a forest landowner whose forest no longer has value. There are 2,609 forest landowners owning less than 1,000 acres in the four-county area. The tussock moth infestation has spread to 561 of these holdings, seriously reducing the security and livelihood of a substantial number of citizens. The traditional economic wealth of the remaining landowners also has been reduced.

5. There are approximately 600 acres of state-owned recreation and scenic areas infested. In 1972, 200 acres of trees were killed in the Hilgard-Perry Scenic Area, five miles northwest of La Grande. The Oregon State Highway Department has since been forced to clearcut large portions of the area. The state forest properties which are most seriously threatened by a continuation of the infestation include Blue Mountain Forest Wayside, Emigrant Springs State Park, Hilgard Junction State Park, and the remainder of the Hilgard-Perry Scenic Area. Additional properties which have not yet been damaged, but which are located near areas of heavy defoliation, include the Minam Recreation Area and the Wallowa Lake Highway Forest Wayside. The estimated impact resulting from a continuation of this outbreak will be a 50-percent reduction in visitor use and overnight camping.
6. Availability of escape cover for big game is particularly critical in the winter months. Defoliation and tree death affect winter range in two ways; there is a direct loss of cover and, more important, salvaging the killed areas creates clearcut patches. Present areas being clearcut range from five to approximately 3,000 acres. In the larger salvage areas, the resulting slash presents serious barriers to movement of deer and elk, and all but the fringe of the cutting areas are generally avoided because

of exposure. These lands contain many of the popular and productive hunting locations in the area.

7. The killing of streamside trees by the tussock moth has, in some cases, raised summertime water temperatures to the detriment of the fish habitat.
8. Hundreds of thousands of acres of forest land have been robbed of their aesthetic appeal, and their value for recreational uses has been seriously reduced. This summer much of the area was closed to recreationists, including an early archery season.
9. The impact of the epidemic has contributed to a reduction of available forest resources on private and state-owned lands until a new stand is established. The anticipated growth loss on the defoliated lands is approximately 58 million board feet. The estimated total dollar impact through growth loss will be approximately four million dollars (Table II).
10. Foresters in northeast Oregon generally rely upon natural regeneration to establish their new forest. Reestablishing the 12,649 Defoliation Class I acres will present a formidable reforestation job. In addition to the planting cost it will be necessary to do extensive site preparation to ensure successful planting stock survival. The forestry

practices required to reestablish the timber stand represent new financial burdens confronting the affected landowners.

The cone-producing portion of the fir trees have been destroyed in Defoliation Class II acres. It may require 20 to 40 years before these trees will produce another seed crop. Consequently, natural regeneration will be unreliable on the 34,625 acres involved in these areas. If fir regeneration is to be achieved, the landowner will need to consider some artificial regeneration for an extended time period following timber harvesting operations.

The estimated cost of reestablishing a new forest on those lands requiring rehabilitation is \$1,395,000.

11. The additional fire hazard created on the tussock moth killed and damaged forest lands has adversely impacted the ability of the fire protection agencies to meet their protection goals. A gross acreage of 327,600 acres (22% of the Northeast Oregon District) is involved on which an average of 30 fires occur annually (42% man-caused and 58% lightning-caused). Experience indicates an annual occurrence rate of 9.2 fires per 100,000 acres protected in the tussock moth area, which is 26 percent above the overall average for the District. The 22 percent of the

District impacted has experienced 32 percent of the man-caused fires and 25 percent of our lightning-caused fires. Thus, not only does the infestation encompass a relatively high fire occurrence area, but it also includes an area susceptible to man-caused fires. Fuel types within the infested area have been converted from standing green forests to standing dead forests mixed with large areas of slash resulting from clearcutting. The rate of fire spread in these damaged stands and slash areas is estimated to be ten to seventeen times greater than the original stands.

The increased potential for uncontrolled spread of wildfire under extremely hazardous conditions has caused the several fire protection agencies involved to develop stringent fire prevention measures and to assess their needs in terms of manpower and equipment. The State Forestry Department estimates that this impact on the fire protection needs will involve an immediate increase of \$530,900.

12. The total loss impact that will accrue to private and state land ownerships in terms of timber loss, growth loss, rehabilitation costs, increased fire protection costs and diminished land values is estimated to be \$9,546,400.

### Total Economic Impact

<u>Impact</u>	<u>Net Dollar Loss*</u>
Volume Loss	\$2,331,000
Growth Loss	3,970,000
Rehabilitation	1,395,000
Fire Protection	1,137,900
Land Development Values	712,500
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Total Dollar Loss	\$9,546,400

\*PNW discounted at six percent.

### Other Considerations

The primary hosts of this forest insect are Douglas-fir and white fir. In the Blue Mountains these species occur on the best timber-growing sites, characterized by the deepest soils and greatest rainfall. The impact resulting from this epidemic is greater, therefore, than a direct ratio of these acres to the total forest area.

1. The U. S. Forest Service Resource Bulletin PNW-3, May 1963, indicates that each million board feet of timber harvested will provide local employment for one year for nine men. Additional jobs are required outside the area to convert the previously waste items, chips, to pulp and paper. These primary resource jobs generate a similar number of secondary service jobs such as doctors, clerks, teachers, salesmen, etc. Private timber resources associated with this epidemic can be directly related to economy, jobs

and taxes. The severity of these losses will be directly related to the tenure of this infestation.

2. According to an industrial hygienist for the State Accident Insurance Fund (SAIF), "the moth which has infested 200,000 acres of northeastern Oregon forest has been found to be a health hazard to humans, too." Woodworkers have complained of hives, a rash, and breathing difficulties. The allergy is caused by the tiny barbed hairs which cover both the moth and its cocoon. The increased number of dead white fir trees scattered throughout the infestation area will also create an additional safety hazard confronting recreationists and other forest users.
3. Public opinion in northeast Oregon regarding the tussock moth and the ability of government to solve the problem faced by its citizens has been impacted by the continued growth of the infestation. Twenty-three local organizations have been formed to bring into focus the extent of the damage and the resulting costs of the epidemic. These groups represent a broad cross section of the northeastern Oregon public.

Local opinion perhaps has been illustrated best by a recent local news supplement devoted to the subject. The document sets forth statements by responsible citizens,

including a U. S. congressman, state legislators, county judges, bankers, landowners and government administrators. The publication supports these statements with substantial detailed discussion regarding the detrimental public impact of the tussock moth infestation.

With all the data and general information that has been generated by the various agencies involved, the feeling of the citizens most directly involved is that the cost of the uncontrolled infestation far exceeds the potential adverse effects of any known control measures.

#### 1972 vs. 1973

The size of the tussock moth infestation in 1973 compared with its status in 1972 reveals the substantial growth of the area involved and the impact on privately owned forest lands. The current information also reveals the conservative nature of projections for 1973 that were made in 1972. In 1972, for example, there were 3,750 acres of privately owned forest land with Class I defoliation. At that time, the projections for 1973 anticipated a 240-percent increase. The current data indicates, however, that the area of Class I damage actually increased 420 percent. The total area of measurable defoliation on privately owned and state-owned forest land increased from 37,710 acres in 1972 to 109,000 acres in 1973, an approximate threefold increase (Table I).

## PROJECTIONS

Current biological data indicate that approximately 121,000 acres of private land are within the area where measurable defoliation (high-risk) can be anticipated in 1974. An additional 9,000 acres of private land are considered to be of low risk at the present time but may warrant control action after further evaluation.

Approximately ten percent of the high-risk acreage is outside of the area defoliated in 1973.

The principal concern at this time is toward the increased impact of continued defoliation on those extensive areas in which top killing occurred in 1973, since further defoliation will cause major tree mortality.

## QUESTIONS TO BE ANSWERED

The most serious impacts of the tussock moth infestation may be related to questions for which we do not yet have satisfactory answers. These questions concern damage to the forest site, water quality, air quality, and potential catastrophic damage by fire.

Among the more serious questions that are being asked and need to be answered are:

1. What is the extent of fire damage that may reasonably be anticipated in the future as a result of the tussock moth damage to state and private forests? Similarly, to what

degree are adjacent and uninfested forests threatened by the potential for uncontrolled wildfire?

2. How will air quality of the region be impacted by the potential for increased incidence of wildland fires?
3. What impact will the increased logging activity to salvage dead and dying trees have on water quality in the northeast Oregon community?
4. What will be the unstabilizing impact on the regional economy in terms of jobs, small forest land tenure, and industrial productivity?

The full impact of the tussock moth infestation on the local and national scene will be more clearly understood when the answers to these questions have been provided.

TABLE I

PROJECTED AND ACTUAL ACRES OF DEFOLIATION BY  
OWNERSHIP AND DAMAGE CLASS IN NORTHEAST OREGON

	<u>1972 Actual</u>	<u>1973 Projected</u>	<u>1973 Actual</u>
Class I and Dead			
Forest Service	4,640	21,399	36,510
Private	3,750	9,094	15,791
Total	<u>8,390</u>	<u>30,493</u>	<u>52,301</u>
Class II			
Forest Service	34,780	70,214	122,450
Private	13,820	41,180	38,922
Total	<u>48,600</u>	<u>111,394</u>	<u>161,372</u>
Class III			
Forest Service	40,980	89,364	140,060
Private	20,140	51,444	54,287
Total	<u>61,120</u>	<u>140,808</u>	<u>194,347</u>
Total			
Forest Service	80,940	180,977	299,020
Private	37,710	101,048	109,000
Total	<u>118,650</u>	<u>282,025</u>	<u>408,020</u>

TABLE II. PROJECTED MORTALITY AND GROWTH LOSS (MBF)  
ON PRIVATE FOREST LANDS FOR 1973

<u>Age of Stand Impacted</u>	<u>Volume Impact (MBF)</u>		<u>Total</u>
	<u>Mortality</u>	<u>Growth Loss</u>	
Mature	219,000	37,000	256,000
Immature	17,000	21,000	38,000
	<hr/>	<hr/>	<hr/>
Gross Total Loss	236,000	58,000	294,000
Salvage	187,000	-----	187,000
	<hr/>	<hr/>	<hr/>
Net Total Loss	49,000	58,000	107,000

TABLE III. PRESENT NET WORTH\* OF PROJECTED MORTALITY  
AND GROWTH LOSS ON PRIVATE FOREST LANDS  
FOR 1973

<u>Age of Stand Impacted</u>	<u>Dollar Value Impact</u>		<u>Total</u>
	<u>Mortality</u>	<u>Growth Loss</u>	
Mature	14,355,000	3,132,000	17,487,000
Immature	651,000	838,000	1,489,000
	<hr/>	<hr/>	<hr/>
Gross Total Loss	15,006,000	3,970,000	18,976,000
Salvage	12,675,000	-----	12,675,000
	<hr/>	<hr/>	<hr/>
Net Total Loss	2,331,000	3,970,000	6,301,000

\*Values computed at 6 percent interest rate.

TABLE IV  
ACRE AND VOLUME IMPACTS

A. <u>Mortality</u>	<u>Large Private</u>	<u>Small Private</u>	<u>Total</u>
1. Mature Stands (Requiring Clearcutting)			
Acres	7,400	3,600	11,000
Vol./Ac.	(7.97)	(7.78)	
Volume (MMBF)	59	28	87
% Sal.	95%	65%	
Sal. MMBF	56	18	74
Loss MMBF	3	10	13
2. Mature Stands (Requiring Partial Cutting)			
Acres	10,800	5,000	15,800
Vol./Ac.	(8.43)	(8.2)	
Volume (MMBF)	91	41	132
% Sal.	95%	65%	
Sal. MMBF	86	27	113
Loss MMBF	5	14	19
3. Immature Stands (Requiring Conversion)			
Acres	2,400	700	3,100
Annual Growth	(.200 MBF)	(.150 MBF)	
Average Age	(30 years)	(30 years)	
Loss MMBF	14	3	17 MMBF

TABLE IV  
ACRE AND VOLUME IMPACTS  
(continued)

B. <u>Growth Loss</u>	<u>Large Private</u>	<u>Small Private</u>	<u>Total</u>
1. Mature Stands			
Acres	39,043	15,425	54,468
Annual Growth	(.250 MBF)	(.175 MBF)	
Number of Years (weighted average)	(3)	(3)	
Volume (MMBF)	29	8	37 MMBF
2. Immature Stands			
Acres	24,491	13,257	37,748
Annual Growth	(.200 MBF)	(.150 MBF)	
Number of Years (weighted average)	(3)	(3)	
Volume (MMBF)	15	6	21 MMBF

TABLE V  
DOLLAR IMPACT

	<u>Large Private</u>	<u>Small Private</u>	<u>Total</u>	
A. Dollar Loss Through Mortality				
1. Mature Stands				
MMBF	(Vol. Killed	150	69	219
	(Vol. Sal.	142	45	(85%) 187
	(Vol. Loss	8	24	(15%) 32
	\$/M	\$75	\$45	\$65.55
	Value Killed	\$11,250,000	\$ 3,105,000	\$14,355,000
	Value Sal.	\$10,650,000	\$ 2,025,000	\$12,675,000
	Value Loss	\$ 600,000	\$ 1,080,000	\$ 1,680,000
2. Immature Stands (Perpetual Yields Delayed 55 Years) [Cap PNW - (Cap PNW) discounted 55 years]				
	Cap Factor	1/.06	1/.06	
	Acres	2,400	700	3,100
	Acres Matured/Year	.05	.05	
	Average Yield	4 MBF	3 MBF	
	Net Stumpage	\$75	\$45	
	Cap PNW	\$600,120 (\$250/Ac.)	\$ 78,765 (\$113/Ac.)	
	Discount Factor <sub>55</sub>	.0406	.0406	
	Discount Value	\$ 24,365	\$ 3,198	
	Diff. (Value Loss)	\$575,755 (\$240/Ac.)	\$ 75,567 (\$108/Ac.)	\$651,322

TABLE V  
DOLLAR IMPACT  
(continued)

	<u>Large Private</u>	<u>Small Private</u>	<u>Total</u>
B. Dollar Loss Through Growth Loss			
1. Mature Stands			
Acres	39,043	15,425	54,468
Annual Growth Loss	.250M	.175	
Stumpage Value	\$75	\$45	
Annual \$ Loss	\$ 732,056	\$ 121,472	
Year 1 (.94)	\$ 688,133	\$ 114,184	
Year 2 (.89)	\$ 651,530	\$ 108,110	
Year 3 (.84)	\$ 614,927	\$ 102,037	
	<hr/>	<hr/>	<hr/>
Total Four- Year Loss PNW	\$2,686,646	\$ 445,803	\$3,132,449
2. Immature Stands			
Acres	24,491	13,257	37,748
PNW/Acre	\$250	\$113	
PNW	\$6,122,750	\$1,498,041	
Dis. 3 Years	.89	.89	
Dis. PNW	\$5,449,247	\$1,333,256	
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Diff. (Value Loss)	\$ 673,503	\$ 164,785	\$ 838,288